Space Weather Forecast

Issued on Friday, 24 February 2023 at 12:25 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate solar activity likely throughout (Minor/Moderate R1/R2 radio blackouts). Chance of G1/Minor Storm Days 3 and 4 (26-27 Feb) due to coronal hole influence.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Low with occasional Common-class flares occurring over the last 24 hours. There are now six sunspot regions on the visible disc, most with some magnetic complexity, but varying in size. The largest region on the disc is in the northeast, with magnetic complexity in one of the intermediate spots. A region near north centre disc, whilst small, also has some magnetic complexity and a north-south magnetic alignment which is likely to increase shear. A region in the southeast grew rapidly during the period. Other regions either showed some decay or were small and simple.
Currently no significant Earth-directed Coronal Mass Ejections (CMEs) are forecast, although glancing impacts may occur on 25 Feb.

Solar Wind / Geomagnetic Activity: Solar winds were indicative of a coronal hole fast wind. The wind speed was mostly elevated, varying between 500-610 km/s, but declining recently to around 470 km/s. The Interplanetary Magnetic Field was initially largely moderate, but became mostly weak from 24/0400 UTC. The north-south component, Bz, was initially weakly negative, but became mostly weakly positive from 23/2300 UTC. Geomagnetic activity was initially Unsettled to Active (Kp 3-4), becoming mostly Quiet later in the period.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary
Solar Activity: Solar activity is likely to be Moderate with a slight chance of High activity. The most likely regions to flare are the large region in the northeast or the smaller region near north centre disc, and perhaps also the region in the southeast which has developed rapidly in the last 24 hours.

Solar Wind / Geomagnetic Activity: A glancing blow from a CME is possible on 25 Feb, but most of this should pass above Earth and confidence is low. Earth is currently experiencing a coronal hole fast wind. There are two further coronal holes which are expected to influence solar winds over the next four days. Overall, it seems likely that wind speeds will be elevated or slightly elevated for much of this period, perhaps increasing to strong by Day 4 (27 Feb). Geomagnetic activity is expected to be Quiet to Active with a risk of G1/Minor Storms due to the various fast wind influences. This risk is probably highest on Days 3 and 4 (26-27 Feb) due to the likely arrival of a stronger fast wind.

Energetic Particles / Solar Radiation: There is a slight chance of solar radiation rising towards the S1 level, should any larger flares occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	10	30	30
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	60	60	60	60
Very Active	R3 to R5 X	No	15	15	15	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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